

REMARKS

This paper is filed in response to the Office Action mailed February 24, 2006, in connection with the above-identified patent application. Claims 1-31 and 33-42 are pending in the application. Claims 1-3 and 12-19 have been amended and new Claims 43-49 have been added by this Amendment.

Claim Rejections Under 35 U.S.C. § 112

Claims 1-18 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter with applicants regard as the invention.

In accordance with comments provided in the Office Action (*see* Office Action, p. 2), Claim 1 has been amended to avoid indefiniteness in pointing out and distinctly claiming the subject matter of the claimed invention. In particular, the term "may be" has been replaced with the more definite term "is." Accordingly, the first limitation of Claim 1, as amended, reads as follows:

A system for providing information regarding the operation of a control system, comprising: a Web server module associated with said control system, said Web server module having a memory operative to store a non-markup language Web site database that is used to dynamically generate a markup language Web page in response to a request, wherein said Web page is populated by the Web server module with information regarding the operation of the control system in response to the request.

In light of the current amendment to Claim 1, it is believed that Claim 1 is definite and that the rejection under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Claims 2-18 are dependent on Claim 1 and are likewise believed to be definite and patentable. Accordingly, the applicants respectfully request that the rejection of Claims 2-18 under 35 U.S.C. § 112, second paragraph, be withdrawn.

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Claim Rejections Under 35 U.S.C. § 103

Claims 1-9, 12-15, 17-21, 24-31, and 33-42

Claims 1-9, 12-15, 17-21, 24-31, and 33-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,282,454, issued to Papadopoulos et al. (hereinafter "Papadopoulos") in view of U.S. Patent No. 6,484,149, issued to Jammes et al. (hereinafter "Jammes").

Applicants respectfully submit that the above claims of the present application, as amended, are patentable over Papadopoulos and Jammes, either alone or in combination. Papadopoulos fails to teach or suggest providing the ability to define attributes of a Web site using a non-markup language, store non-markup language information defining attributes of the Web site in a Web site database, and using the Web site database to dynamically generate a Web site that may be used to provide information regarding a control system (Claims 1-9, 12-15, 17-21, 24-31, and 33-42). Likewise, Jammes fails to teach or suggest a method for defining attributes of a Web site that are used to provide a status of a control system from a remote location. Also, neither patent provides any motivation or suggestion to "one of the ordinary skill in the art at the time of invention to incorporate the teachings of Jammes into those of Papadopoulos to make the system more efficient and customizable." *See Office Action*, p. 3. Prior to discussing more detailed reasons why applicants believe that all of the pending claims of the present application, as amended, are allowable over Papadopoulos and Jammes, a brief description of the present invention and the cited references is presented.

Summary of the Present Application

The present application generally relates to the field of process control systems. More particularly, the present application is directed toward providing the ability to define attributes of a Web site without using a markup language, wherein that Web site may then be used to provide information regarding the operation of a control system, such as a programmable logic controller ("PLC"). Additionally, upon receipt of a non-markup language that defines the attributes of a

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Web site, the claimed invention stores that data in a manner that requires less memory space than storing conventional markup language Web pages.

In an embodiment, the invention includes a Web server module configuration application that provides an easy-to-use interface for defining attributes of a Web site that may be used to provide information about a control system. *See* Application, p. 12. In particular, the Web server module configuration application allows a user to define attributes of a Web site using a non-markup language by providing the user with easy-to-use menus and interfaces. The menus and interfaces allow a user to design a Web site through selections on a number of display screens rather than through the use of a markup language. *Id.* The Web server module configuration application stores the user-made selections in a non-markup language Web site database and transmits that database to the Web server module. *Id.* The Web server module utilizes the contents of the non-markup language Web site database to dynamically generate markup language pages for a user when a request is received. *Id.*

Once a user has defined the Web site via the Web server configuration application, the Web server configuration application stores the information as a non-markup language Web site database, also referred to in the application as a screen database (e.g., FIGURE 5, element 112) and transmits that database to the Web server module. *Id.* at 15. When requested, the Web server module utilizes the contents of the non-markup language Web site database to dynamically generate markup language Web pages. *Id.* Information about the control system may then be provided to a user via the dynamically generated Web pages.

Storing the non-markup language Web site database allows a user to create a database that does not just store Web pages, but instead stores all attributes required to dynamically generate pages of the Web site when requested.

Numerous advantages may be realized by the system, method, and apparatus recited in the claims of the present application. In one aspect, a user may define, from a remote location, a Web site that may later be used for providing information regarding the operation of a control

system without having to use a markup language. As discussed in the Background section of the application and as discussed below with respect to Papadopoulos, the main drawback with existing Web server-based systems for accessing data contained in the memory of a control system is the difficulty in creating and modifying the Web site that is provided by the Web server module. This process is typically an arduous one that involves an operator creating each of the Web pages of the Web site using a standard markup language, such as the hyper-text markup language ("HTML") or extensible markup language ("XML"), and possibly a programming language such as JAVA®. While PLC operators are often well versed in ladder logic, HTML, XML, and JAVA are typically foreign topics. Providing a system, method, and apparatus that allows a user to define a Web site using non-markup languages resolves this drawback of existing server-based systems such as Papadopoulos.

In another aspect, embodiments of the present invention store data defining a Web site in a manner that requires less memory than storing conventional markup language Web pages. Web servers generally use non-volatile memory to store conventional markup language Web pages and any associated information, such as graphics. Typically, a standard file system is created within the non-volatile memory with all the HTML contents for a page rendering stored there. For large Web sites, such a storage scheme results in a large amount of non-volatile memory being consumed. The claimed invention, in contrast, only stores the information necessary to generate a Web site when requested, thereby reducing memory requirements.

Papadopoulos et al. (U.S. Patent No. 6,282,454)

Papadopoulos is purportedly directed toward a Web interface for a programmable controller. The stated goal of Papadopoulos is "to develop an automation control system whereby a user could use general, commercial networks such as the Internet in place of specialized industrial networks to remotely monitor automation control devices such as PLCs." (Papadopoulos, Col. 2, lines 25-30.) In accordance with that goal, Papadopoulos describes as follows:

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a system of essential elements including . . . a Web interface, a local network, and a network interface to at least one PLC control system . . . The Web interface runs Web pages from an Ethernet board coupled directly to the PLC back plane and includes an HTTP protocol interpreter, a PLC back plane driver, a TCP/IP stack, and an Ethernet board kernel.

(Col. 2, lines 45-54.)

In using the system, Papadopoulos describes that a user can enter the address of the Web site that will display a home page that may contain text; some type of multimedia offerings such as graphic images, video, or audio; and possibly hypertext links to other documents. The Web site home page and other pages of the Web site are provided by the Web server. (Col. 4, lines 10-15.)

While Papadopoulos describes the ability for a user to obtain snapshots of the status of a control system from a remote location via seven predefined Web pages, Papadopoulos fails to teach or suggest a system or method for defining attributes of a Web site that is used to provide that information, as called for in the claims of the present application. Likewise, Papadopoulos fails to teach or suggest how the Web site that is used to provide information regarding the PLC is stored. As such, there is no teaching or suggestion of storing a non-markup language Web site database defining attributes of a Web site associated with the control system, wherein the non-markup language Web site database is in a format that may be utilized by a central processing unit to dynamically render Web pages of the Web site. Papadopoulos is limited to a system that uses conventional markup language Web pages to provide snapshots of control system information.

Jammes et al. (U.S. Patent No. 6,484,149)

Jammes is purportedly directed towards software tools for developing and operating Web sites. The stated goal of Jammes is to provide a software architecture for allowing merchants to design and efficiently manage computer network-based electronic stores. In accordance with this goal, Jammes describes a system that comprises an enhanced Web browser that accesses an electronic store design application (hosted by a store Web site) via the Internet to generate a

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graphical user interface. This graphical user interface displays information about the products and groups of products offered by the electronic store. (Col. 3, lines 13-25.) A user (store designer) manipulates the user interface to cause a Web server to modify relationships between products and product groups stored in a product information database through a relational database server. (Col. 8, lines 46-68.) The relational database server formats the generic database transaction commands received from the Web server as necessary to generate specific database transaction commands required to retrieve, store, or modify information stored in the product information database. (Col. 8, lines 65-68.)

Jammes teaches the method of designing and maintaining a Web-based electronic store by creating and updating the data records of a product information database using generic database transaction commands. However, Jammes fails to teach a method for defining attributes of a Web site that is used to provide a status of a control system from a remote location. Jammes is limited to a method for managing the content of an electronic Web-based store by updating its contents through the enhanced Web browser's querying the product information database. As such, there is no teaching or suggestion of modifying and customizing a predefined Web site by utilizing a Web server module configuration application which resides on the user's computer and creates a Web site database transmitted to a Web server module.

The Claims Distinguished

Independent Claims 1, 19, 27, and 38.

The Office Action asserts that Papadopoulos teaches a system for providing information regarding the operation of a control system, comprising a Web server module associated with said control system and a computer operative to receive non-markup language configuration data defining the web site, to store and to transmit it to the Web server. Office Action, p. 3. The Office Action acknowledges that Papadopoulos does not explicitly describe a method and process for creation of a non-markup language Web site database and transmission of this database to the Web server module. *Id.*

The Office Action refers to Jammes et al. as teaching a system and method for viewing product information and generating web pages in which a web server opens a template file related to the requested web page, creates hyperlinks and other information content by executing database references embedded within the template file to generate a markup language page. The Office Action states that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Jammes into those of Papadopoulos to make the system more efficient and customizable." Office Action, pp. 3-4. The applicants respectfully disagree with this statement for the reasons stated below.

Non-markup language limitation

As recited above, Claim 1 describes a system that provides a user with the ability to receive markup language Web pages containing information about operation of a control system from a Web server module by creating a "non-markup language Web site database," transmitting "said database to said Web server module," and requesting and receiving "said markup language Web page from said Web server module," wherein "said Web server module having a memory operative to store a non-markup language Web site database is used to dynamically generate a markup language Web page in response to a request."

Similarly, Claim 19 includes the limitation of storing "a non-markup language Web site database defining attributes of a Web site associated with a control system, said non-markup language Web site database in a format that is utilized by said central processing unit to dynamically render Web pages of said Web site."

Claim 27 includes the limitation of "dynamically generating a Web page defined by the non-markup language configuration data stored as a non-markup language Web site database that provides information regarding the operation of a control system."

Claim 38 also includes the limitation of "receiving a non-markup language Web site design, wherein the non-markup language Web site design defines attributes of a Web site," as well as storing and transmitting the said non-markup language Web site.

A system, method, and apparatus that provides the ability to define attributes of a Web site using a non-markup language, store that non-markup language instead of conventional markup language Web pages, and dynamically generate Web pages based on that information, enable users to easily create a Web site without having to know a markup language. Additionally, storing attributes that may be used to dynamically generate a Web page, as opposed to storing conventional Web pages and associated information, reduces the total amount of required memory.

As discussed above, Jammes discloses a software architecture for allowing merchants to design and efficiently manage computer network-based electronic stores. The essential element of that software is the enhanced Web browser, which includes a tree structure control and store management control components. The store management control component uses the relationship data to direct the tree structure control to construct a local data structure representing the hierarchy of groups of an electronic store, thus enabling the tree structure control to draw graphical and textual elements of a store design user interface. (Jammes, Col. 11, lines 15-50.) The store management control component of the enhanced Web browser correlates the visual arrangement of elements displayed by the store design user interface with the relationships between products and groups stored in the relationships table. Col.11, lines 37-40. In other words, when a user (i.e., a store designer) selects a group of products to examine its contents, the store management control component determines what products are contained in the group and renders the correct display of the product list. Col.11, lines 54-58.

Thus, Jammes effectively teaches the management of an electronic store by establishing and maintaining relationships between the products table and the groups of products table using the relationships table, all three tables being stored in the product information database (Col. 10, lines 10-20; Figure 3, element 116), and representing this relationship as the hierarchical display of the store design user interface generated by the enhanced Web browser. Col.11, lines 25-32; Figure 3, elements 112 and 310.

The claims of the present application, in contrast to Jammes, claim a method, process, and apparatus for providing data regarding the operation and monitoring of a control system that allows a user to create a desired Web site by providing a variety of possible choices on a number of display screens. Thus, the technological problem, for which the claimed invention offers a solution, is different from that of Jammes. The claimed invention, in contrast to Jammes, includes a limitation of a non-markup language Web site database that is created by a user based on his or her needs, transmitted and stored in a Web server module and is utilized by a Web server module to generate and transmit back to the user the markup language Web pages upon request. Jammes fails to teach this limitation.

Web Server Module Configuration Application Limitation

The claimed invention proposes the solution whereby the Web server module configuration application is used to customize the predefined Web site that resides on a Web server module by manipulating the variety of screens rendered by the Web server module configuration application, from security profiles to data access screens to tag and table modifications to page contents and linkages, and then to transmit the configured non-markup language Web site database to the Web server module. Application, p. 21, lines 15-20. The Web server module configuration application provides a flexible and economical way to access, modify, and configure the Web pages that are generated by the Web site, as well to configure the hardware of the Web server module itself, and does not require the use of a markup language in the process. The non-markup language Web site database created with the help of the Web server module configuration application requires much less storage memory on the Web server module than a markup language Web site database would have.

In contrast, Jammes solves a different (and more narrow) problem of maintaining the relationship between the products and the product groups stored in the product information database by using the graphical user interface of the enhanced Web browser. Jammes suggests a method whereby "[a] user manipulates the Web browser store design interface to cause a Web

server to modify relationships between products and product groups stored in a database." Jammes, Abstract. Jammes fails to teach the limitation of using a Web server configuration application to create a non-markup language Web site database.

As the Office Action acknowledged, Papadopoulos does not teach a method and process for creation of a non-markup language Web site database using a Web server configuration application, and transmitting and storing that database in the Web server module. Likewise, Jammes fails to teach these limitations. If the teachings of Jammes were incorporated in those of Papadopoulos, it would not lead to any meaningful result that could be used as a substitution for a solution presented by the claimed invention. Thus, the combination of Jammes and Papadopoulos cannot render Claims 1, 19, 27, and 38 obvious.

Claim 1 has also been amended to include the limitation of having a Web server module configuration application as a part of the claimed system to further clarify and distinguish the claimed subject matter. Likewise, Claim 19 has been amended to include in the apparatus a remote computer operative to store a Web server module configuration application utilized by a user to create a non-markup language Web site database and to communicate with the central processing unit.

The Data Records Collection in Jammes and in the Claimed Invention

The applicants agree with the Office Action statement that "Jammes disclosure would allow one to create and update the data records of an information database in response to user manipulation of the GUI." Office Action, p. 4. However, the problem of collecting the data from the programmable logic controller (PLC) is different from the problem of providing that data to the user in a way that does not require a user to create a Web site using a markup language. Also, the source of data in Jammes (the product information database) is technologically different from the one in the current invention (PLC memory register) and using the Jammes approach of collecting data through querying the database simply would not work for the purposes of collecting data from the PLC memory. The problem of collecting data is

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solved in the current invention with the Web server module that is associated to a controller and is operative to request, receive and store information regarding the status of the controller through the interface means. Application, p. 10, lines 19-21.

Accordingly, independent Claims 1, 19, 27, and 38 are believed to be patentable over Papadopoulos and Jammes, and withdrawal of this rejection is requested.

Dependent Claims 2-18, 20-26, 28-31, 33-37, and 39-42

Claims 2-18 depend from Claim 1; Claims 28-31 and Claims 20-26 ultimately depend from Claim 19; Claims 33-37 ultimately depend from Claim 27; and Claims 39-42 ultimately depend from Claim 38. As discussed above, Papadopoulos combined with Jammes fail to render obvious each of the limitations recited in Claims 1, 19, 27, and 38. Accordingly, for the above-mentioned reasons, Claims 2-18, 20-26, 28-31, 33-37, and 39-43 are likewise believed to be allowable over Papadopoulos combined with Jammes.

Dependent Claims 10, 11, 16, 22, and 23

Claims 10, 11, 16, 22, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Papadopoulos and Jammes in view of U.S. Patent No. 6,453,687, issued to Sharood et al. (hereinafter "Sharood"). The applicants respectfully submit that Claims 10, 11, and 16 depend from Claim 1 and Claims 22 and 23 depend from claim 19. Accordingly, these claims should be allowable if Claims 1 and 19 are allowable.

New Claims 43-49

Responding to the Office Actions, the applicants introduce the following new claims that further define the limitations of the claimed invention:

Dependent Claim 43 has been added to include the limitation of storing the Web server module configuration application on a remote computer and executing it by the user.

Dependent Claim 44 has been added to include the limitation of a type of a control system claimed in the present invention as being a programmable logic controller (PLC).

Independent Claim 45 has been added to include a method for defining operational characteristics of a Web server module and for producing a non-markup language Web site design by utilizing the Web server module configuration application stored and executed on the user's remote computer.

Dependent Claims 46-49 provide further limitations to the claimed invention that are not disclosed in Papadopoulos or Jammes by listing the specific configuration aspects of a Web server module and the table definitions of the non-markup language Web site database that could be added, subtracted or modified with the help of the Web server module configuration application.

CONCLUSION

Based on the above-referenced arguments and amendments, applicants respectfully submit that all of the pending claims of the present application, Claims 1-31 and 33-49, are allowable over the cited and applied references. Because the cited and applied references fail to teach a method, system, and apparatus for providing information regarding the operation of a control system that utilizes non-markup language configuration data defining attributes of a Web site, storing the configuration data as a Web site database, and dynamically generating a Web page from the non-markup language Web site database in response to a request, applicants respectfully request withdrawal of the rejections of the claims and allowance of the present application. Reconsideration and reexamination of the application, as amended, and allowance of the claims at an early date is solicited. If the Examiner has any questions or comments concerning this matter, the Examiner is invited to contact applicants' undersigned attorney at the number provided below.

Respectfully submitted,

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